IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	:	Goddard, et al. (as amended)
Appl. No.	:	10/036,342
Filed	:	December 26, 2001
For	:	POLYPEPTIDES THAT INDUCE CELL PROLIFERATION (as amended)
Examiner	:	Daniel E. Kolker
Group Art Unit	:	1646

DECLARATION UNDER 37 C.F.R. §1.808

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

I hereby aver that the nucleic acid of SEQ ID NO: 56, which encodes the protein of SEQ ID NO: 57, was deposited with the American Type Culture Collection (ATCC) April 20, 1999 and was given ATCC deposit number 203948. Accordingly, the deposited material has been accepted for deposit under the Budapest Treaty on the International Recognition of the deposit of Microorganisms for the Purposes of Patent Procedure and all restrictions on the availability to the public of the material so deposited will be irrevocably removed upon granting of the patent. The deposit will be maintained for a term of at least 30 years and at least five (5) years after the most recent request for the furnishing of a sample of the deposit was received by the depository

The deposited material is identical to the biological material and was in the Applicant's possession at the time the application was filed.

GENENTECH, INC.

Date: 5/26/05 By: _____

Title: PATENT AGENT

1722912
052005

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	:	Goddard et al. (as amended)
Appl. No.	:	10/036,342
Filed	:	December 26, 2001
For	:	POLYPEPTIDES THAT INDUCE CELL PROLIFERATION (as amended)
Examiner	:	Kolker, Daniel E.
Group Art Unit	:	1646

DECLARATION UNDER 37 CFR §1.131

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

We declare and state as follows:

1. We are the inventors of the invention claimed in the above-captioned patent application.

2. During the time period in which we participated in the events and activities described herein, we were employed by Genentech, Inc., the assignee of the above-captioned application.

3. All of the events and activities described herein were performed by us personally, or by others at our direction as part of our duties as employees of Genentech, Inc.

4. The invention claimed in the above-captioned patent application was conceived and reduced to practice in the United States prior to November 18, 1999 as described below.

5. Prior to November 18, 1999, we conceived of the invention claimed in the above-captioned patent application. This is demonstrated by the attached sequence printout (Exhibit A), which was generated prior to November 18, 1999, and which shows the complete sequence of the nucleic acid having the sequence of SEQ ID NO: 56. The attached printout also shows the complete sequence of the polypeptide which has the sequence of SEQ ID NO: 57. As evidenced by the sequence printout, we were in possession of the complete nucleic acid and amino acid sequences prior to November 18, 1999.

6. The date deleted from Exhibit A is prior to November 18, 1999. This date was redacted pursuant to M.P.E.P. § 715.07. The date that remains is the date the report was printed, April 28, 2005.

7. After these initial experiments, we diligently reduced the claimed subject matter to practice by working to express and purify the encoded polypeptide and to run it systematically

through many assays. The cDNA was deposited with the American Type Culture Collection (ATCC) on April 20, 1999 and assigned ATCC no. 203948. The protein of interest was assigned a "protein inventory number" (*e.g.*, PIN1205-1), and this protein is a polypeptide having the sequence of SEQ ID NO:57, and is encoded by SEQ ID NO: 56.

8. Exhibit B shows that the protein lot designated PIN1205-1 was delivered to James Pan on a date prior to November 18, 1999 in order to perform assay ASY92, called "Mouse Mesangial Cell proliferation Assay." Also, as shown in Exhibit B, the assay was completed on a date prior to November 18, 1999. Exhibit B also shows that the tested polypeptides tested positive ("All Positives"), thereby confirming the ability of the encoded polypeptide to induce mesangial cell proliferation. Thus, actual reduction to practice occurred on a date prior to November 18, 1999.

9. The dates deleted from Exhibit B all are prior to November 18, 1999. These dates were redacted pursuant to M.P.E.P. § 715.07. The date that remains is the date the report was printed, April 28, 2005.

10. After reducing the invention to practice, we worked with the Genentech, Inc. patent department to prepare a non-provisional patent application, which included the sequences of SEQ ID NO:56 and SEQ ID NO:57, as well as the data showing the ability to induce mesangial cell proliferation. That application was filed on March 1, 2000 as PCT/US00/05601.

11. We hereby declare that all statements made herein of our own knowledge are true and that all statements made on information or belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful statements may jeopardize the validity of the application or any patent issued thereon.

By: _____ Date: 6/7/05
Audrey Goddard

By: _____ Date: _____
Paul J. Godowski

By: _____ Date: _____
Austin L. Gurney

By: _____ Date: _____
James Pan

By: _____ Date: _____
Colin K. Watanabe

By: _____ Date: _____
William I. Wood

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By: _____ Date: _____
Audrey Goddard

By: Paul J. Godowski Date: 5/31/05
Paul J. Godowski

By: _____ Date: _____
Austin L. Gurney

By: _____ Date: _____
James Pan

By: _____ Date: _____
Colin K. Watanabe

By: _____ Date: _____
William I. Wood

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By: _____ Date: _____
Audrey Goddard

By: _____ Date: _____
Paul J. Godowski

By: _____ Date: 6/8/05
Austin L. Gurney

By: _____ Date: _____
James Pan

By: _____ Date: _____
Colin K. Watanabe

By: _____ Date: _____
William I. Wood

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By: _____ Date: _____
Audrey Goddard

By: _____ Date: _____
Paul J. Godowski

By: _____ Date: _____
Austin L. Gurney

By: _____ Date: June 9/05
James Pan

By: _____ Date: _____
Colin K. Watanabe

By: _____ Date: _____
William I. Wood

1719338; 051805

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By: _____ Date: _____
Audrey Goddard

By: _____ Date: _____
Paul J. Godowski

By: _____ Date: _____
Austin L. Gurney

By: _____ Date: _____
James Pan

By: Colin K Watanabe Date: 6/8/2005
Colin K. Watanabe

By: _____ Date: _____
William I. Wood

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By: _____ Date: _____
Audrey Goddard

By: _____ Date: _____
Paul J. Godowski

By: _____ Date: _____
Austin L. Gurney

By: _____ Date: _____
James Pan

By: _____ Date: _____
Colin K. Watanabe

By: _____ Date: 5/19/05
William I. Wood

EXHIBIT A

ASY92

Assay Name	Mouse Messengial Cell proliferation Assay
Alias Name	Mu Mess Cell Prolif
Status	Retired
Class	Primary
Format	96 Well
Type	Cell
Sample Requirements	
Assay Volume	0.1 ml
Fold Dil Into Well	10 Fold
Replicates	3
Dilutions	2
Volume Requested	0.03ml/well/conc
Protocol	
Species	Mouse
Purpose	Screen SPDI proteins which can stimulate Messengial Cell Proliferation
Protocol	On day 1: Mouse messengial cells are plated on a 96 well plate in Media[A 3:1 mixture of Dulbecco's modified Eagle's medium and Ham's F12 medium- 95%- fetal bovine serum-5%- supplemented with 14mM hepes] and grw overnight. On day 2: SPDI Proteins are diluted at 2 conc. [1%- 0.1%] in serum-free Media and added to the cells. On day 4: After 48 hours incubation- each well of the plate was added 20 µl of the Cell Titer 96 Aqueous one solution reagent [Promega] and colormetric reaction was allowed for 2 hours. The absorbance [OD] is measured at 490 nm.
Matrix	Promega kit for the assay-
Result Calculation	replicated average
Result Interpretation	Any PIN that gives an absorbance reading which is 15% above the media control is considered a hit.
Result Cutoff	> 15 %
	In Vivo: InVitro:
Comments	
Status	
Date Entered	
Date Canceled	
Department	Endocrinology
Scientist	James (Guohua) Pan
Notebook	0-
Assayers	

Status	Retired
Cancel Reason	
Bioarea	Endocrinology
Lab Scientist	Weiguang Mao

GenenGenes | SITEMAP | Additional Resources:

GENE VIEWER | GENE | FAM | MAP | GENEHUB
SEQUENCE VIEWER | DNA | SRC | RNA | LIB | FLS | OLI
ASSAY VIEWER | PRO | DOM | EXP | PUR | LOT | ASY

Find / New / Update

SELECT | GO

[redacted]

Assay Viewer

SPDI Assays

ASY1 Heart Neonatal Hypertrophy
ASY2 Heart Adult Hypertrophy
ASY3 Adipocyte Lipolysis
ASY4 Adipocyte Lipogenesis
ASY5 Hematopoiesis: stem cell proliferation
ASY6 Hippocampal Neuron Survival
ASY7 Retinal Neuron Survival (5-6 days cultur
ASY8 Endothelial cell proliferation
ASY9 Inhibition of VEGF stimulated endothelia
ASY10 Eosinophil degranulation (induction of)
ASY11 B cell IgE synthesis inhibition

Select All | Unselect

Find Lots

All PIN
All DNA

Show Lots for: PIN

Number: 1205

Include UNQ Related Lots

Lots for Search

PIN1205-1

Remove | Remove All

All Positives | Verified Positives | Pending

Date Complete From | To

ASSAY RESULT LIST

Rows 1 - 2 of 2 | Page 1 of 1 | Select Page Page No. 1 GO

ASY	ASY Name	PUR/EXP/DNA	LOT	LOT Name	Pos	Verified	Conc	Conc Unit	Mean	Crtl	UNQ	Protein Name	Date Distr	Date Complete	Comment
ASY92	Mu.Mess Cell Prolif	PUR1715	LOT2447	PIN1205-1			0.10	%	1		UNQ1915	Human DPKL1915 IgG			
ASY92	Mu Mess Cell Prolif	PUR1715	LOT2447	PIN1205-1			1.00	%	1		UNQ1915	Human DPKL1915 IgG			

EXHIBIT B

>Thursday, April 28, 2005
>DNA92234 [Full]
>887 Sites [All Sites]
>   [DNA92234], sheldens
> Lib309
>Sequence confirmed by phredphrap

```
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                                    nlaIII     snaBI
                                   sphI   fnuDII/mvnI                  mnlI
                                   nspHI  bstUI taiI                  taqI
                              taiI  nspI   bsh1236I                   xhoI
                              maeII/hpyCH4IV bsiWI/splI       tsp509I[M.ecoRI-]
                         aluI   hinlI/acyI cac8I   bsaAI        ecoRI    tliI
      tsp45I      sapI       ahaII/bsaHI  mluI rsaI       hpy188I     smlI
      maeIII      mboII      aatII  cac8I afl III maeII/hpyCH4IV       paeR7I            hpy188I aciI       bpmI/g
    hphI   sfcI  earI/ksp632I hpy99I  hpyCH4V csp6I  aluI   apoI     avaI[M.taqI-]   mnlI     fnu4HI/bsoFI hpy18
1 TAGGTGACAC TATAGAAGAG CTATGACGTC GCATGCACGC GTACGTAAGC TCGGAATTCG GCTCGAGGAA TGAATACCTC CGAAGCCGCT TTGTTCTCCA
  ATCCACTGTG ATATCTTCTC GATACTGCAG CGTACGTGCG CATGCATTCG AGCCTTAAGC CGAGCTCCTT ACTTATGGAG GCTTCGGCGA AACAAGAGGT
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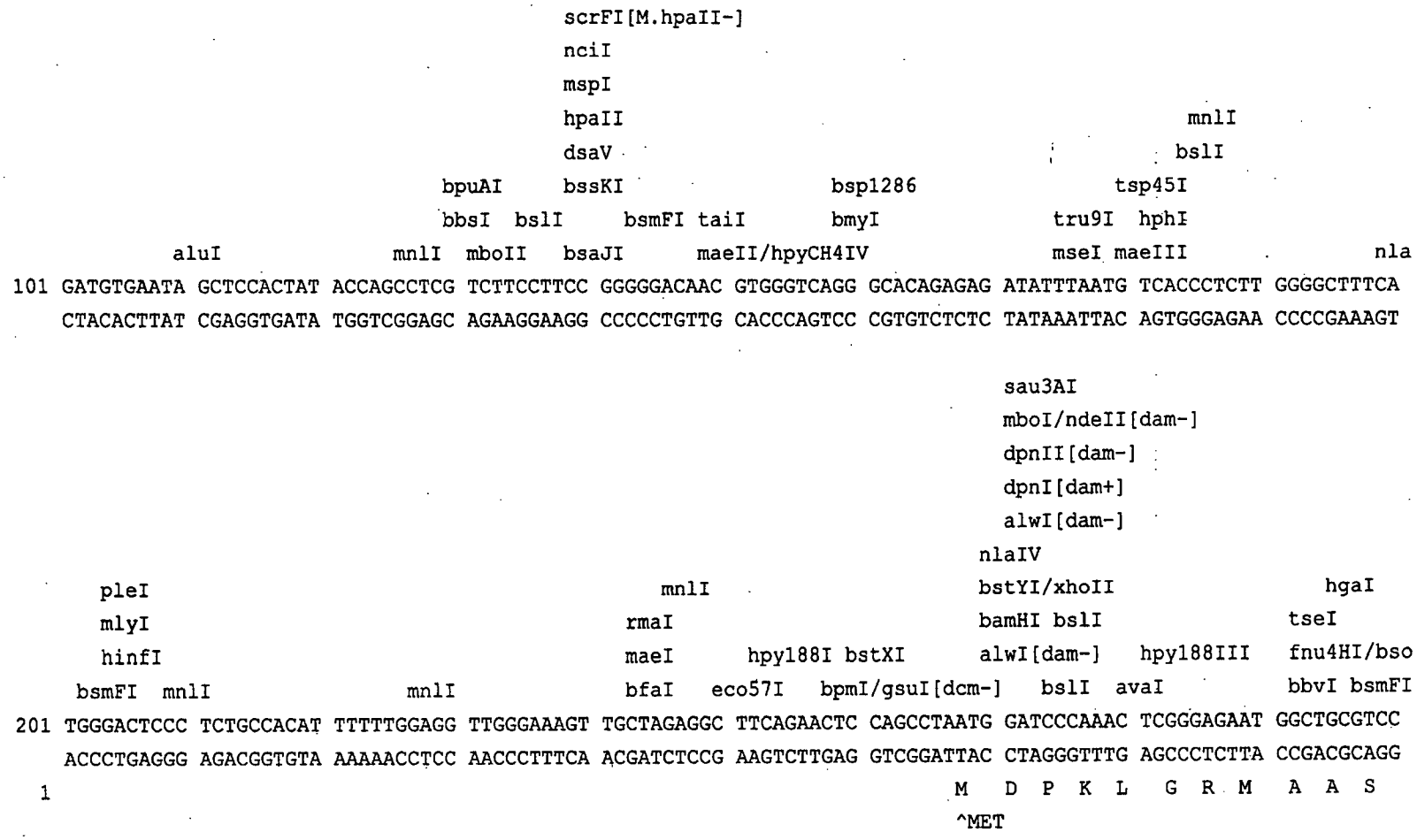
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taiI
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tru9I
hphI
aluI
mnlI
mboII
bsaJI
maeII/hpyCH4IV
mseI
maeIII
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bfaI
eco57I
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avaI
bbvI bsmFI
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ACCCTGAGGG AGACGGTGTA AAAAACCTCC AACCCTTTCA ACGATCTCCG AAGTCTTGAG GTCGGATTAC CTAGGGTTTG AGCCCTCTTA CCGACGCAGG
1
M D P K L G R M A A S
^MET

```
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                tseI mwoI       thaI nlaIII                  haeII
                mwoI fnu4HI/bsoFI nspHI                     mspI
                fnu4HI/bsoFI    fnuDII/mvnI                scrFI[M.hpaII-]
                bbvI bbvI       bstUI[M.hhaI-]             nciI
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             mwoI fnu4HI/bsoFI hinPI nspI      hphI      mwoI hpaII            bbsI     rsaI      mnlI
     mwoI    fnu4HI/bsoFI      hhaI/cfoI     mnlI      aciI bssKI           xmnI mboII  csp6I     ecoNI
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 12 L  L  A  V   L  L  L   L  L  E   R  G  M  F   S  S  P   S  P  P   P  A  L  L   E  K  V   F  Q  Y   I  D  L  H

                                                                                           mboII
                                                                                          earI/ksp632I
                                                                                         sapI
                                                                                        aluI
                                                                                       sstI
                                                                                       sacI
                                                  tth111I/aspI                         hgiAI/aspHI[M.aluI-
                                                  pleI                                 ecl136II
      apoI      alwNI[dcm-]         haeIII/palI   pflFI                                bsp1286[M.aluI-]
    fokI tsp509I alw26I/bsmAI      mscI/balI      mlyI                                 bsiHKAI hpy188I
    bstF5I     hpyCH4V             eaeI  taqI     hinfI                       hpy188I  bmyI eco57I     ea
   hpy188III  bsgI hgaI eco57I     cfrI  hpy188III                     mnlI  eco57I    banII[M.aluI-]  cf
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    TAGTCCTACT TAAACACGTC TGCGACTTCC TCACCCACCG GTAGCTCTCG CTGAGACAGG TCGGACACGG AGCGAAGTCT GTTCTCGAGA AGTCTTACTA
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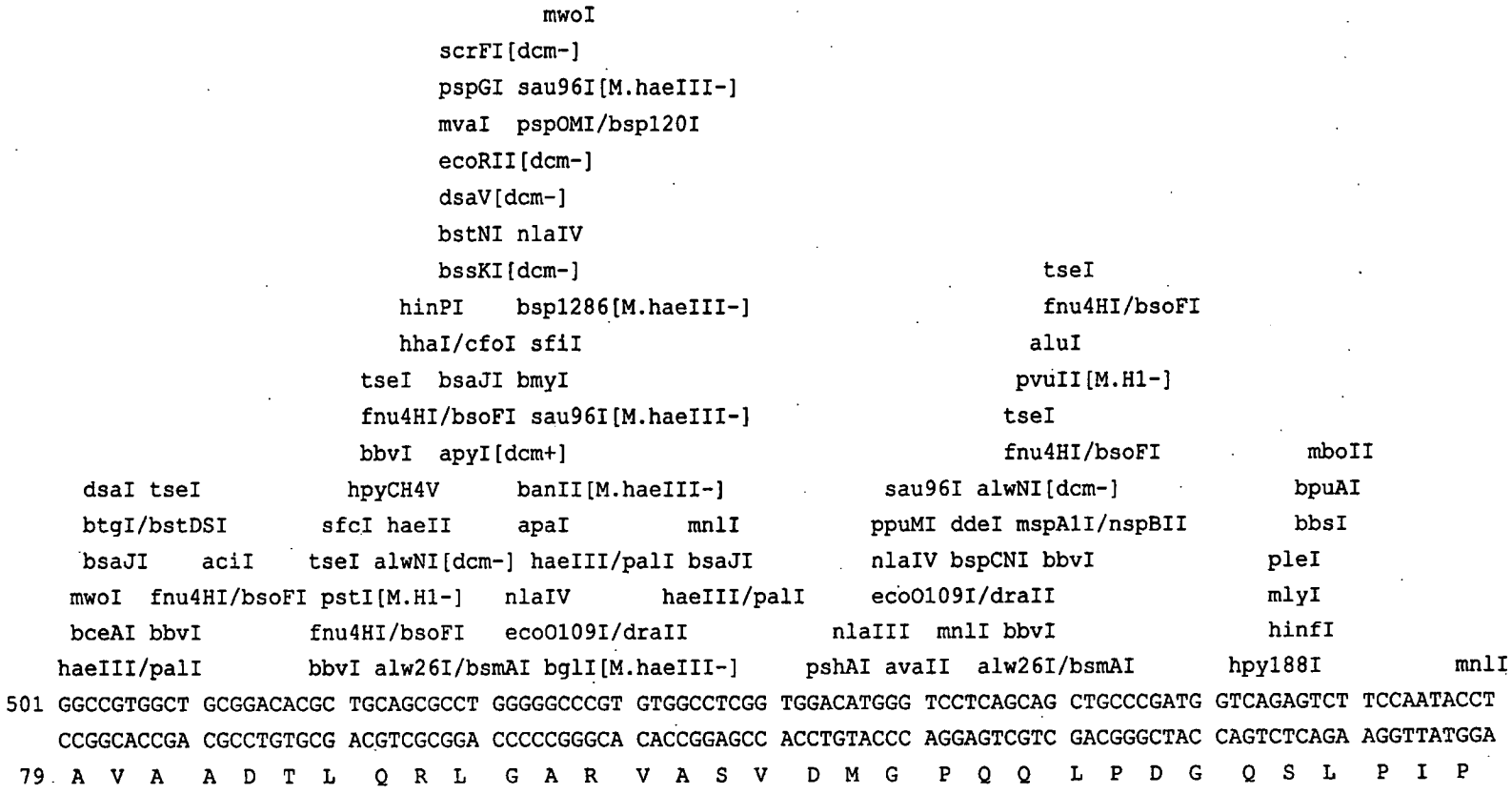


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 79 A  V  A  A  D  T  L  Q  R  L  G  A  R  V  A  S  V  D  M  G  P  Q  Q  L  P  D  G  Q  S  L  P  I  P
```

```
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        scrFI[dcm-]
        pspGI
        mvaI
        ecoRII[dcm-]                                                                              scrFI[M.hpaII-]
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        bssKI[dcm-]        mboI/ndeII[dam-] bst4CI/hpyCH4III               bsgI   cac8I      hpaII
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      bstF5I haeIII/palI   alwI[dam-]    banI      mwoI  bceAI         btrI hpyCH4V          bsaJI
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     GGGCAGTAGG ACCGGCTTGA CCCCTCGCTA GGGTGCTTTC CGTGGCACAC GAAGATGCCG GTGAACCTGC ACGTCGGACG ACTGGCCCCG CTACCCACCG
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                                                                                                 sau3AI  mwoI
                                                                                    bslI         mboI/ndeII[dam-]
      sau96I                                                                    sau96I[M.haeIII-] dpnII[dam-]    hi
      nlaIV                accI                       mnlI   mcrI               haeIII/palI       dpnI[dam+]     hh
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 701 TCACGGACCC CTATGTGCTG ACGGAGGTAG ACGGGAAACT TTATGGACGA GGAGCGACCG ACAACAAAGG CCCTGTCTTG GCTTGGATCA ATGCTGTGAG
     AGTGCCTGGG GATACACGAC TGCCTCCATC TGCCCTTTGA AATACCTGCT CCTCGCTGGC TGTTGTTTCC GGGACAGAAC CGAACCTAGT TACGACACTC
 146   T  D  P   Y  V  L   T  E  V  D   G  K  L   Y  G  R   G  A  T  D   N  K  G   P  V  L   A  W  I  N   A  V  S
```

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                 scrFI[dcm-]                                                                                 mnlI
                 pspGI                                                                                    bpmI/gsuI[dcm-]
                 mvaI        sau3AI                                                                      scrFI[dcm-]
                 ecoRII[dcm-]                                                                            pspGI
                 dsaV[dcm-] mboI/ndeII[dam-]                                                             mvaI
                 bstNI      dpnII[dam-]                                                                  ecoRII[dcm-]
            bsp1286        bstYI/xhoII                                                                   dsaV[dcm-]
            bmyI bssKI[dcm-]  mboII                                                                      bstNI
         hpy188I apyI[dcm+] dpnI[dam+]                               fokI  mboII cac8I                   bssKI[dcm-]
       eco57I   bsaJI       bglII                  tsp509I           bstF5I   mnlI                       apyI[dcm+]
     mwoI   banII bpmI/gsuI[dcm-]                 apoI          mnlI      earI/ksp632I                  bsaJI
801 CGCCTTCAGA GCCCTGGAGC AAGATCTTCC TGTGAATATC AAATTCATCA TTGAGGGGAT GGAAGAGGCT GGCTCTGTTG CCCTGGAGGA ACTTGTGGAA
    GCGGAAGTCT CGGGACCTCG TTCTAGAAGG ACACTTATAG TTTAAGTAGT AACTCCCCTA CCTTCTCCGA CCGAGACAAC GGGACCTCCT TGAACACCTT
179  A  F  R   A  L  E  Q   D  L  P   V  N  I   K  F  I  I   E  G  M   E  E  A   G  S  V  A   L  E  E   L  V  E
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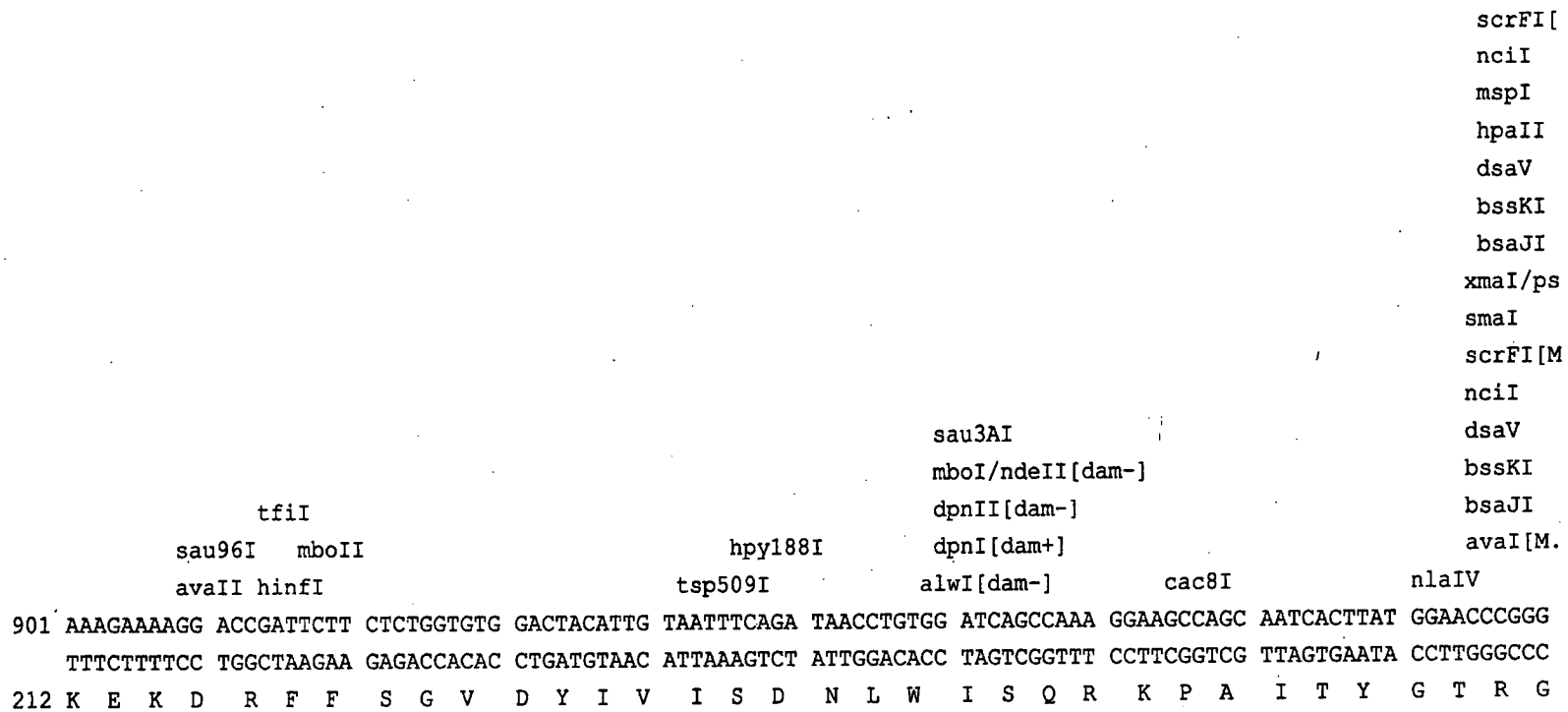
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nciI
mspI
hpaII
dsaV
bssKI
bsaJI
xmaI/ps
smaI
scrFI[M
nciI
dsaV
bssKI
bsaJI
avaI[M.
sau3AI
mboI/ndeII[dam-]
dpnII[dam-]
dpnI[dam+]
alwI[dam-]
tfiI
sau96I
mboII
avaII
hinfI
hpy188I
tsp509I
cac8I
nlaIV
901 AAAGAAAAGG ACCGATTCTT CTCTGGTGTG GACTACATTG TAATTTCAGA TAACCTGTGG ATCAGCCAAA GGAAGCCAGC AATCACTTAT GGAACCCGGG
TTTCTTTTCC TGGCTAAGAA GAGACCACAC CTGATGTAAC ATTAAAGTCT ATTGGACACC TAGTCGGTTT CCTTCGGTCG TTAGTGAATA CCTTGGGCCC
212 K E K D R F F S G V D Y I V I S D N L W I S Q R K P A I T Y G T R G

```
                                                scrFI[dcm-]
                                                pspGI
                                                mvaI
                                                ecoRII[dcm-]
                                                dsaV[dcm-]
                                                bstNI
                                                bssKI[dcm-]                                  nlaIII          sau3AI    sap
                                           bsmAI              hpy188III         fokI   rcaI              mboI/ndeII[da
                                 hphI      bsaI             ddeI nlaIV          bstF5I hpy188III         dpnII[dam-]
        aluI     nlaIII  mnlI     hpyCH4V  apyI[dcm+]   bspCNI              sfaNI   bspHI              dpnI[dam+] ea
1001 GGAACAGCTA CTTCATGGTG GAGGTGAAAT GCAGAGACCA GGATTTTCAC TCAGGAACCT TTGGTGGCAT CCTTCATGAA CCAATGGCTG ATCTGGTTGC
     CCTTGTCGAT GAAGTACCAC CTCCACTTTA CGTCTCTGGT CCTAAAAGTG AGTCCTTGGA AACCACCGTA GGAAGTACTT GGTTACCGAC TAGACCAACG
 246   N  S  Y  F  M  V  E  V  K  C  R  D  Q  D  F  H  S  G  T  F  G  G  I  L  H  E  P  M  A  D  L  V  A
```

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                                                  scrFI[dcm-]
                                                  pspGI
                                                  mvaI
                                                  ecoRII[dcm-]
                                                  dsaV[dcm-]
                                                  bstNI
                                                  bssKI[dcm-]
                                               sau96I[dcm-]
                                               nlaIV
                    accI                       avaII[dcm-]
                scrFI[dcm-]                 scrFI[dcm-]
                pspGI  pleI                 pspGI   apyI[dcm+]
                mvaI   mlyI                 mvaI bsmFI
                ecoRII[dcm-]                ecoRII[dcm-]
                dsaV[dcm-]                  dsaV[dcm-]
                bstNI  hinfI                bstNI  bsaJI                                    mnlI
                bssKI[dcm-]                 bssKI[dcm-] tfiI       xmnI  nlaIV          mboII
    mboII       apyI[dcm+]                  apyI[dcm+]  hinfI      asp700    mnlI       earI/ksp632I
1101 TCTTCTCGGT AGCCTGGTAG ACTCGTCTGG TCATATCCTG GTCCCTGGAA TCTATGATGA AGTGGTTCCT CTTACAGAAG AGGAAATAAA TACATACAAA
     AGAAGAGCCA TCGGACCATC TGAGCAGACC AGTATAGGAC CAGGGACCTT AGATACTACT TCACCAAGGA GAATGTCTTC TCCTTTATTT ATGTATGTTT
 279  L  L  G   S  L  V  D   S  S  G   H  I  L   V  P  G  I   Y  D  E   V  V  P   L  T  E  E   E  I  N   T  Y  K
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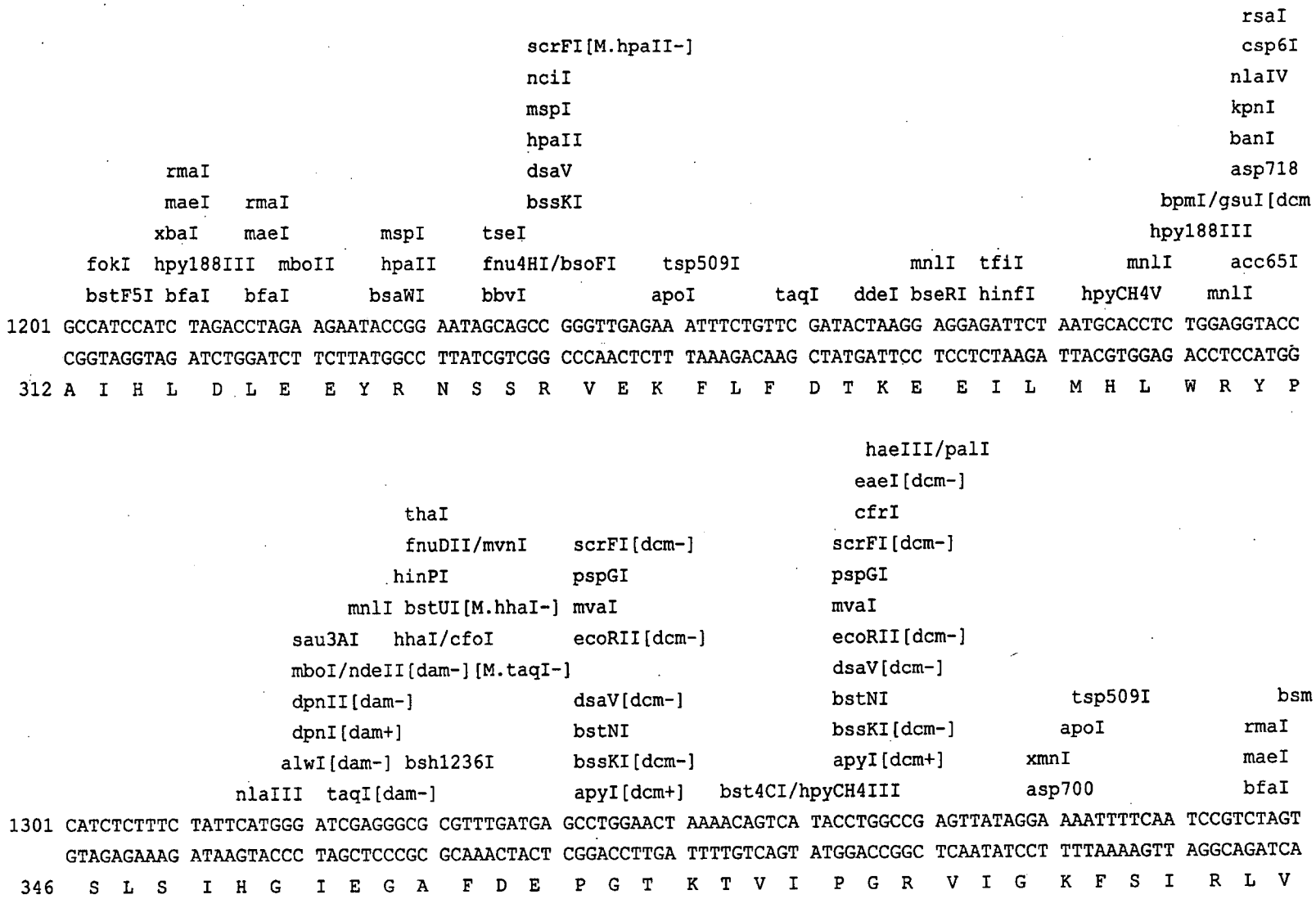
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scrFI[M.hpaII-]
csp6I
nciI
nlaIV
mspI
kpnI
hpaII
banI
dsaV
asp718
rmaI
bssKI
bpmI/gsuI[dcm
maeI
rmaI
xbaI
maeI
mspI
tseI
hpy188III
fokI
hpy188III
mboII
hpaII
fnu4HI/bsoFI
tsp509I
mnlI
tfiI
mnlI
acc65I
bstF5I
bfaI
bfaI
bsaWI
bbvI
apoI
taqI
ddeI
bseRI
hinfI
hpyCH4V
mnlI
1201 GCCATCCATC TAGACCTAGA AGAATACCGG AATAGCAGCC GGGTTGAGAA ATTTCTGTTC GATACTAAGG AGGAGATTCT AATGCACCTC TGGAGGTACC
CGGTAGGTAG ATCTGGATCT TCTTATGGCC TTATCGTCGG CCCAACTCTT TAAAGACAAG CTATGATTCC TCCTCTAAGA TTACGTGGAG ACCTCCATGG
312 A I H L D L E E Y R N S S R V E K F L F D T K E E I L M H L W R Y P
haeIII/palI
eaeI[dcm-]
thaI
cfrI
fnuDII/mvnI
scrFI[dcm-]
scrFI[dcm-]
hinPI
pspGI
pspGI
mnlI
bstUI[M.hhaI-]
mvaI
mvaI
sau3AI
hhaI/cfoI
ecoRII[dcm-]
ecoRII[dcm-]
mboI/ndeII[dam-][M.taqI-]
dsaV[dcm-]
dpnII[dam-]
dsaV[dcm-]
bstNI
tsp509I
bsm
dpnI[dam+]
bstNI
bssKI[dcm-]
apoI
rmaI
alwI[dam-]
bsh1236I
bssKI[dcm-]
apyI[dcm+]
xmnI
maeI
nlaIII
taqI[dam-]
apyI[dcm+]
bst4CI/hpyCH4III
asp700
bfaI
1301 CATCTCTTTC TATTCATGGG ATCGAGGGCG CGTTTGATGA GCCTGGAACT AAAACAGTCA TACCTGGCCG AGTTATAGGA AAATTTTCAA TCCGTCTAGT
GTAGAGAAAG ATAAGTACCC TAGCTCCCGC GCAAACTACT CGGACCTTGA TTTTGTCAGT ATGGACCGGC TCAATATCCT TTTAAAAGTT AGGCAGATCA
346 S L S I H G I E G A F D E P G T K T V I P G R V I G K F S I R L V

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                                                                                                                pl
      nlaIII                           tsp45I                                                                   ml
     mslI                              maeIII          mboII              xmnI                                  hi
   mnlI mslI          aciI            hphI          hpy188III             asp700     bstXI                   nlaII
1401 CCCTCACATG AATGTGTCTG CGGTGGAAAA ACAGGTGACA CGACATCTTG AAGATGTGTT CTCCAAAAGA AATAGTTCCA ACAAGATGGT TGTTTCCATG
     GGGAGTGTAC TTACACAGAC GCCACCTTTT TGTCCACTGT GCTGTAGAAC TTCTACACAA GAGGTTTTCT TTATCAAGGT TGTTCTACCA ACAAAGGTAC
379  P  H  M   N  V  S  A   V  E  K   Q  V  T   R  H  L  E   D  V  F   S  K  R   N  S  S  N   K  M  V   V  S  M

                                                                                     tspRI
                                                                               hpy188I                          sau
                                                                  mwoI        sau3AI  bst4CI/hpyCH4III          mbo
     rmaI        dsaI                                          tseI          mboI/ndeII[dam-]                   dpn
     maeI        btgI/bstDSI  sspI                             fnu4HI/bsoFI  dpnII[dam-]                        dpn
     bfaI        bsaJI    hpyCH4V               bsrI           bbvI          dpnI[dam+]                         alw
1501 ACTCTAGGAC TACACCCGTG GATTGCAAAT ATTGATGACA CCCAGTATCT CGCAGCAAAA AGAGCGATCA GAACAGTGTT TGGAACAGAA CCAGATATGA
     TGAGATCCTG ATGTGGGCAC CTAACGTTTA TAACTACTGT GGGTCATAGA GCGTCGTTTT TCTCGCTAGT CTTGTCACAA ACCTTGTCTT GGTCTATACT
412  T  L  G  L   H  P  W   I  A  N   I  D  D  T   Q  Y  L   A  A  K   R  A  I  R   T  V  F   G  T  E   P  D  M  I
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                sau3AI
                mboI/ndeII[dam-]
                dpnII[dam-]                               sau3AI
           fokI dpnI[dam+]                     scrFI[dcm-]
           bstF5I                              pspGI  mboI/ndeII[dam-]
        scrFI[M.hpaII-]                        mvaI   dpnII[dam-]
        nciI    alwI[dam-]                     ecoRII[dcm-]
        mspI   nlaIV                           dsaV[dcm-]
        hpaII  bstYI/xhoII                     bstNI  dpnI[dam+]                          mspA1I/nspBII
        dsaV   bamHI          tsp509I          bssKI[dcm-]                           tsp509I
        bssKI  alwI[dam-]     munI/mfeI        apyI[dcm+]                         mwoI    aciI    aluI
1601 TCCGGGATGG ATCCACCATT CCAATTGCCA AAATGTTCCA GGAGATCGTC CACAAGAGCG TGGTGCTAAT TCCGCTGGGA GCTGTTGATG ATGGAGAACA
     AGGCCCTACC TAGGTGGTAA GGTTAACGGT TTTACAAGGT CCTCTAGCAG GTGTTCTCGC ACCACGATTA AGGCGACCCT CGACAACTAC TACCTCTTGT
 446   R  D  G   S  T  I   P  I  A  K   M  F  Q   E  I  V   H  K  S  V   V  L  I   P  L  G   A  V  D  D   G  E  H

                                                                                                              tru9I
                                                                   tseI                           aluI    mseI
                                                 nlaIV             fnu4HI/bsoFI              sau96I[M.haeIII-]
                                              mnlI        tsp509I  bbvI         ddeI         haeIII/palI aseI/asnI/vspI
1701 TTCGCAGAAT GAGAAAATCA ACAGGTGGAA CTACATAGAG GGAACCAAAT TATTTGCTGC CTTTTTCTTA GAGATGGCCC AGCTCCATTA ATCACAAGAA
     AAGCGTCTTA CTCTTTTAGT TGTCCACCTT GATGTATCTC CCTTGGTTTA ATAAACGACG GAAAAAGAAT CTCTACCGGG TCGAGGTAAT TAGTGTTCTT
 479  S  Q  N   E  K  I  N   R  W  N   Y  I  E   G  T  K  L   F  A  A   F  F  L   E  M  A  Q   L  H  O
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                 sau3AI
                 mboI/ndeII[dam-]
                 dpnII[dam-]
                 dpnI[dam+]
            hpy188I                                  rmaI
               sau3AI    tspRI                       maeI
         hpy188I  alwI[dam-]                        bslI
     rmaI      mboI/ndeII[dam-]    hphI            bslI                                 tsp509I  rmaI
     maeI      dpnII[dam-]      tfiI   mnlI      fokI bfaI    fokI                     apoI     maeI    rsaI
     bfaI      dpnI[dam+]       hinfI[M.hphI-]   bstF5I       bstF5I         hpy188III          bfaI    csp6I
1801 CCTTCTAGTC TGATCTGATC CACTGACAGA TTCACCTCCC CCACATCCCT AGACAGGGAT GGAATGTAAA TATCCAGAGA ATTTGGGTCT AGTATAGTAC
     GGAAGATCAG ACTAGACTAG GTGACTGTCT AAGTGGAGGG GGTGTAGGGA TCTGTCCCTA CCTTACATTT ATAGGTCTCT TAAACCCAGA TCATATCATG

                                                                                           sau96I
                                  sau3AI                                                   nlaIV
                                  mboI/ndeII[dam-]                                         avaII     hpyCH4V
                                  dpnII[dam-]                                             ppuMI     bsgI
                tru9I             dpnI[dam+]                                              eco0109I/draII
                mseI            hpy188III                                                tru9I     tspRI
               ahaIII/draI    ecoRV   alwI[dam-]   sspI                                  mseI bsmFI btsI
1901 ATTTTCCCTT CCATTTAAAA TGTCTTGGGA TATCTGGATC AGTAATAAAA TATTTCAAAG GCACAGATGT TGGAAATGGT TTAAGGTCCC CCACTGCACA
     TAAAAGGGAA GGTAAATTTT ACAGAACCCT ATAGACCTAG TCATTATTTT ATAAAGTTTC CGTGTCTACA ACCTTTACCA AATTCCAGGG GGTGACGTGT
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                                                                      scrFI[dcm-]
                                                                      pspGI
                                                                      mvaI
                                                                      ecoRII[dcm-]
                              tseI                                    dsaV[dcm-]
                         cac8I                                        bstNI
                      tseI    fnu4HI/bsoFI                            bssKI[dcm-]
                      fnu4HI/bsoFI                                    apyI[dcm+]
          smlI        bbvI    bbvI                                  bslI       tfiI
         mnlI        aluI    hpyCH4V                       hpyCH4V  bsaJI      hinfI
2001 CCTTCCTCAA GTCATAGCTG CTTGCAGCAA CTTGATTTCC CCAAGTCCTG TGCAATAGCC CCAGGATTGG ATTCCTTCCA ACCTTTTAGC ATATCTCCAA
     GGAAGGAGTT CAGTATCGAC GAACGTCGTT GAACTAAAGG GGTTCAGGAC ACGTTATCGG GGTCCTAACC TAAGGAAGGT TGGAAAATCG TATAGAGGTT

                                                   sau96I         tsp45I
                                                   avaII       bssSI
                                                  ppuMI     hgiAI/aspHI
                                                  ecoO109I/draII hpy188III                   sau3AI
                                  mspI         rmaI         bsp1286                          mboI/ndeII[dam-]
           tsp509I                hpaII        maeI    smlI bsiHKAI                  fokI    dpnII[dam-]
        hpyCH4V                  bsaWI         bfaI   mnlI  bmyI  maeIII             bstF5I  dpnI[dam+]
2101 CCTTGCAATT TGATTGGCAT AATCACTCCG GTTTGCTTTC TAGGTCCTCA AGTGCTCGTG ACACATAATC ATTCCATCCA ATGATCGCCT TTGCTTTACC
     GGAACGTTAA ACTAACCGTA TTAGTGAGGC CAAACGAAAG ATCCAGGAGT TCACGAGCAC TGTGTATTAG TAAGGTAGGT TACTAGCGGA AACGAAATGG

                         tru9I
                         mseI             bsmAI
                        aseI/asnI/vspI  bsaI      tspRI
2201 ACTCTTTCCT TTTATCTTAT TAATAAAAAT GTTGGTCTCC ACCACTGNCT CCCAAAAAAA AAAAAAAAAA AAAAAAAAAA AAAAAAAAAA AAAAAAAAAA
     TGAGAAAGGA AAATAGAATA ATTATTTTTA CAACCAGAGG TGGTGACNGA GGGTTTTTTT TTTTTTTTTT TTTTTTTTTT TTTTTTTTTT TTTTTTTTTT
```

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                                                    scrFI[M.hpaII-]
                                                    nciI
                                                    mspI
                                                    hpaII
                                                    dsaV
                                                    bssKI           sau96I rsaI
                                                   xmaI/pspAI      rsrII/cspI
                                                    smaI          mroI     nlaIV
                                     aciI           scrFI[M.hpaII-] cpoI   kpnI  hpyCH4V
                                    fnu4HI/bsoFI          taqI nciI          hpy188III csp6I
                                   haeIII/palI     sstI  salI  dsaV          bspMII   banI sfcI
                                  mcrI             sacI  hincII/hindII[M.taqI-] avaII[M.hpaII-]
                                  eagI/xmaIII/eclXI aluI accI[M.taqI-]  tru9I mspI    asp718
                                  eaeI             hgiAI/aspHI[M.aluI-] mseI bspEI cfr10I/bsrFI
                                  cfrI       rmaI  ecl136II    bssKI  aseI/asnI/vspI  acc65I  cac8I
                                  bsiEI      maeI  bsp1286[M.aluI-] xmnI  tsp509I  bsaWI   pstI
                                 notI        bfaI  bsiHKAI     bsaJI tsp509I bsaWI ageI   sse8387I
                                 fnu4HI/bsoFI      bmyI hpy99I avaI[M.hpaII-] hpaII mspI bspMI      rsaI
                                 aciI       speI   banII[M.aluI-]   asp700   accIII hpaII sbfI      csp6I aluI    sf
2301 AAAAAAAAAA AAAAAAAAAA AAAGGGCGGC CGCCGACTAG TGAGCTCGTC GACCCGGGAA TTAATTCCGG ACCGGTACCT GCAGGCGTAC CAGCTTTCCC
     TTTTTTTTTT TTTTTTTTTT TTTCCCGCCG GCGGCTGATC ACTCGAGCAG CTGGGCCCTT AATTAAGGCC TGGCCATGGA CGTCCGCATG GTCGAAAGGG

           pleI
           mlyI
           hinfI        aluI
2401 TATAGTGAGT CGTATTAGAG CTTGG
     ATATCACTCA GCATAATCTC GAACC
```

> length: 2425

aatII(GACGTC):	25
acc65I(GGTACC):	1295 2374
accI(GTMKAC):	727 1117 2348
accIII(TCCGGA):	2366
aciI(CCGC):	86 332 355 511 1420 1672 2326 2330
acyI(GRCGYC):	25
afIIII(ACRYGT):	37
ageI(ACCGGT):	2371
ahaII(GRCGYC):	25
ahaIII(TTTAAA):	1914
aluI(AGCT):	19 48 110 485 569 1006 1680 1781 2016 2343 2392 2419
alw26I(CAGNNNCTG):	418 523 565
alwI(GGATCNNNN):	270 271 628 785 959 1319 1599 1609 1610 1817 1936
alwNI(CAGNNNCTG):	418 523 565
apaI(GGGCCC):	533
apoI(RAATTY):	54 409 841 1249 1381 1879
apyI(CCWGG):	528 609 813 882 1038 1113 1137 1144 1342 1363 1638 2061
aseI(ATTAAT):	1787 2219 2360
asnI(ATTAAT):	1787 2219 2360
asp700(GAANNNNTTC):	375 1159 1379 1469 2358
asp718(GGTACC):	1295 2374
aspHI(GWGCWC):	484 2152 2342
aspI(GACNNNGTC):	451
avaI(CYCGRG):	62 280 995 2353
avaII(GGWCC):	559 705 909 1140 1985 2143 2369
balI(TGGCCA):	437
bamHI(GGATCC):	270 1609
banI(GGYRCC):	640 1295 2374

banII(GRGCYC): 484 533 809 2342
bbsI(GAAGACNNNNNN): 130 379 587
bbvI(GCAGC): 292 312 315 318 321 508 519 522 567 570 672 1235 1552 1756 2017 2024
bceAI(ACGGCNNNNNNNNNNNN): 502 656
bfaI(CTAG): 243 1210 1216 1396 1504 1805 1849 1889 2140 2337
bglI(GCCNNNNNGGC): 535
bglII(AGATCT): 822
bmyI(GDGCHC): 159 484 533 809 2152 2342
bpmI(CTGGAG): 96 258 325 814 883 1290
bpuAI(GAAGACNNNNNNN): 130 379 587
bsaAI(YACGTR): 42
bsaHI(GRCGYC): 25
bsaI(GGTCTCNNNNN): 1034 2234
bsaJI(CCNNGG): 139 359 503 528 545 684 812 881 995 996 1143 1516 2060 2353
bsaWI(WCCGGW): 1226 2127 2366 2371
bseRI(GAGGAGNNNNNNNNNN): 342 749 1270
bsgI(GTGCAG): 415 670 1994
bsh1236I(CGCG): 38 331 1329
bsiEI(CGRYCG): 755 2327
bsiHKAI(GWGCWC): 484 2152 2342
bsiWI(CGTACG): 40
bslI(CCNNNNNNNGG): 135 184 274 275 354 396 614 631 771 1847 1848 2060
bsmAI(GTCTC): 1034 2235
bsmAI(GTCTC): 1034 2235
bsmFI(GGGACNNNNNNNNNNNNNN): 143 202 297 1141 1399 1986
bsoFI(GCNGC): 85 292 312 315 318 321 332 508 519 522 567 570 672 1235 1552 1756 2017 2024 2326 2329
bsp120I(GGGCCC): 533
bsp1286(GDGCHC): 159 484 533 809 2152 2342
bspCNI(CTCAGNNNNNNNNN): 563 1050

bspEI(TCCGGA): 2366
bspHI(TCATGA): 1074
bspMI(ACCTGC): 2377
bspMII(TCCGGA): 2366
bsrFI(RCCGGY): 2371
bsrI(ACTGGN): 384 618 1542
bssKI(CCNGG): 139 360 528 609 684 813 882 995 996 1038 1113 1137 1144 1239 1342 1363 1602 1638 2061 2353 2354
bssSI(CTCGTG): 2155
bst4CI(ACNGT): 643 1354 1573
bstAPI(GCANNNNNTGC): 641
bstDSI(CCRYGG): 503 1516
bstF5I(GGATG): 405 606 857 1068 1203 1605 1844 1857 2175
bstNI(CCWGG): 528 609 813 882 1038 1113 1137 1144 1342 1363 1638 2061
bstUI(CGCG): 38 331 1329
bstXI(CCANNNNNNTGG): 260 1478
bstYI(RGATCY): 270 822 1609
btgI(CCRYGG): 503 1516
btrI(CACGTC): 667
btsI(GCAGTGNN): 1992
cac8I(GCNNGC): 31 35 303 675 868 975 2020 2381
cfoI(GCGC): 330 364 525 800 1328
cfr10I(RCCGGY): 2371
cfrI(YGGCCR): 437 500 611 657 1365 2327
cpoI(CGGWCCG): 2368
csp6I(GTAC): 41 387 1296 1897 2375 2387
cspI(CGGWCCG): 2368
ddeI(CTNAG): 563 1050 1265 1767
dpnI(GATC): 271 628 786 823 960 1090 1320 1566 1599 1610 1644 1812 1817 1937 2183

dpnII(GATC): 271 628 786 823 960 1090 1320 1566 1599 1610 1644 1812 1817 1937 2183

draI(TTTAAA): 1914

draII(RGGNCCY): 532 558 768 1984 2142

draIII(CACNNNGTG): 642

dsaI(CCRYGG): 503 1516

dsaV(CCNGG): 139 360 528 609 684 813 882 995 996 1038 1113 1137 1144 1239 1342 1363 1602 1638 2061 2353 2354

eaeI(YGGCCR): 437 500 611 657 1365 2327

eagI(CGGCCG): 2327

earI(CTCTTCNNNN): 15 487 862 1100 1177

ecl136II(GAGCTC): 484 2342

eclXI(CGGCCG): 2327

eco57I(CTGAAG): 250 424 474 489 804

ecoNI(CCTNNNNNAGG): 396

ecoO109I(RGGNCCY): 532 558 768 1984 2142

ecoRI(GAATTC): 54

ecoRII(CCWGG): 528 609 813 882 1038 1113 1137 1144 1342 1363 1638 2061

ecoRV(GATATC): 1929

fnu4HI(GCNGC): 85 292 312 315 318 321 332 508 519 522 567 570 672 1235 1552 1756 2017 2024 2326 2329

fnuDII(CGCG): 38 331 1329

fokI(GGATG): 405 606 857 1068 1203 1605 1844 1857 2175

gsuI(CTGGAG): 96 258 325 814 883 1290

haeII(RGCGCY): 363 524 799

haeIII(GGCC): 438 501 534 543 612 658 769 1366 1776 2328

hgaI(GACGC): 295 420

hgiAI(GWGCWC): 484 2152 2342

hhaI(GCGC): 330 364 525 800 1328

hinPI(GCGC): 330 364 525 800 1328

hincII(GTYRAC): 2348
hindII(GTYRAC): 2348
hinfI(GANTC): 204 451 585 914 1120 1148 1275 1500 1829 2070 2407
hinlI(GRCGYC): 25
hpaII(CCGG): 139 361 684 996 1227 1239 1602 2128 2354 2367 2372
hphI(GGTGA): 3 181 346 1023 1434 1832
hpy188I(TCNGA): 51 79 252 476 491 582 806 946 1568 1809 1814
hpy188III(TCNNGA): 97 281 402 443 1051 1074 1209 1289 1446 1873 1933 2156 2366
hpy99I(CGWCG): 27 2347
hpyCH4III(ACNGT): 643 1354 1573
hpyCH4IV(ACGT): 26 43 149 668
hpyCH4V(TGCA): 34 416 521 671 1030 1283 1524 1995 2023 2051 2104 2380
kpnI(GGTACC): 1295 2374
ksp632I(CTCTTCNNNN): 15 487 862 1100 1177
maeI(CTAG): 243 1210 1216 1396 1504 1805 1849 1889 2140 2337
maeII(ACGT): 26 43 149 668
maeIII(GTNAC): 4 180 1435 2158
mboI(GATC): 271 628 786 823 960 1090 1320 1566 1599 1610 1644 1812 1817 1937 2183
mboII(GAAGA): 15 131 380 488 588 825 862 917 1101 1177 1219 1450
mcrI(CGRYCG): 755 2327
mfeI(CAATTG): 1622
mluI(ACGCGT): 37
mlyI(GAGTCNNNNN): 204 451 585 1120 1500 2407
mnlI(CCTC): 65 77 126 185 209 227 246 344 350 396 469 545 562 598 724 749 853 865 886 1021 1168 1180 1270 1287 1293 1324 1402 1738 1835 2005 2146
mroI(TCCGGA): 2366
mscI(TGGCCA): 437
mseI(TTAA): 175 1788 1915 1981 2220 2361
mslI(CAYNNNNRTG): 400 1405 1407

mspA1I(CMGCKG): 568 1672
mspI(CCGG): 139 361 684 996 1227 1239 1602 2128 2354 2367 2372
munI(CAATTG): 1622
mvaI(CCWGG): 528 609 813 882 1038 1113 1137 1144 1342 1363 1638 2061
mvnI(CGCG): 38 331 1329
mwoI(GCNNNNNNNGC): 303 312 315 321 357 502 535 641 650 793 802 1555 1665
nciI(CCSGG): 139 360 684 995 996 1239 1602 2353 2354
ndeII(GATC): 271 628 786 823 960 1090 1320 1566 1599 1610 1644 1812 1817 1937 2183
nlaIII(CATG): 32 199 336 555 1014 1075 1315 1407 1497
nlaIV(GGNNCC): 270 532 533 558 640 705 991 1054 1140 1164 1295 1609 1741 1985 2374
notI(GCGGCCGC): 2326
nspBII(CMGCKG): 568 1672
nspHI(RCATGY): 31 335
nspI(RCATGY): 31 335
paeR7I(CTCGAG): 62
palI(GGCC): 438 501 534 543 612 658 769 1366 1776 2328
pflFI(GACNNNGTC): 451
pleI(GAGTCNNNN): 204 451 585 1120 1500 2407
ppuMI(RGGWCCY): 558 1984 2142
pshAI(GACNNNNGTC): 553
pspAI(CCCGGG): 995 2353
pspGI(CCWGG): 528 609 813 882 1038 1113 1137 1144 1342 1363 1638 2061
pspOMI(GGGCCC): 533
pstI(CTGCAG): 520 2379
pvuII(CAGCTG): 568
rcaI(TCATGA): 1074
rmaI(CTAG): 243 1210 1216 1396 1504 1805 1849 1889 2140 2337
rsaI(GTAC): 41 387 1296 1897 2375 2387
rsrII(CGGWCCG): 2368

sacI(GAGCTC): 484 2342
salI(GTCGAC): 2348
sapI(GCTCTTCNNNN): 15 486 1099
sau3AI(GATC): 271 628 786 823 960 1090 1320 1566 1599 1610 1644 1812 1817 1937 2183
sau96I(GGNCC): 533 534 559 705 769 909 1140 1776 1985 2143 2369
sbfI(CCTGCAGG): 2378
scrFI(CCNGG): 139 360 528 609 684 813 882 995 996 1038 1113 1137 1144 1239 1342 1363 1602 1638 2061 2353 2354
sfaNI(GCATC): 1067
sfcI(CTRYAG): 10 520 2379 2400
sfiI(GGCCNNNNNGGCC): 534
smaI(CCCGGG): 995 2353
smlI(CTYRAG): 62 2006 2147
snaBI(TACGTA): 42
speI(ACTAGT): 2336
sphI(GCATGC): 31
splI(CGTACG): 40
sse8387I(CCTGCAGG): 2378
sspI(AATATT): 1528 1949
sstI(GAGCTC): 484 2342
taiI(ACGT): 26 43 149 668
taqI(TCGA): 63 443 1259 1322 2349
tfiI(GAWTC): 914 1148 1275 1829 2070
thaI(CGCG): 38 331 1329
tliI(CTCGAG): 62
tru9I(TTAA): 175 1788 1915 1981 2220 2361
tseI(GCWGC): 292 312 315 318 321 508 519 522 567 570 672 1235 1552 1756 2017 2024
tsp45I(GTSAC): 4 180 1435 2158
tsp509I(AATT): 55 410 842 942 1250 1382 1623 1668 1748 1880 2107 2359 2363

tspRI(NNCAGTGNN):	1574 1821 1992 2243
tth111I(GACNNNGTC):	451
vspI(ATTAAT):	1787 2219 2360
xbaI(TCTAGA):	1209
xhoI(CTCGAG):	62
xhoII(RGATCY):	270 822 1609
xmaI(CCCGGG):	995 2353
xmaIII(CGGCCG):	2327
xmnI(GAANNNNTTC):	375 1159 1379 1469 2358

not found:
aclI(AACGTT),afeI(AGCGCT),aflII(CTTAAG),ahdI(GACNNNNNGTC),alw44I(GTGCAC),apaLI(GTGCAC),ascI(GGCGCGCC),
avaIII(ATGCAT),aviII(TGCGCA),avrII(CCTAGG),baeI(NNNNNNNNNNNNNNNACNNNNGTAYCNNNNNNNNNNNN),bbrPI(CACGTG),
bcgI(NNNNNNNNNNNNCGANNNNNNTGCNNNNNNNNNNNN),bciVI(GTATCC),bclI(TGATCA),bfrBI(ATGCAT),bfrI(CTTAAG),blnI(CCTAGG),
blpI(GCTNAGC),bpu1102I(GCTNAGC),bsaBI(GATNNNNATC),bsaXI(NNNNNNNNNNNNACNNNNNCTCCNNNNNNNNNN),bsiCI(TTCGAA),
bsmBI(CGTCTCNNNNN),bsmI(GAATGCN),bsp106(ATCGAT),bsp1407I(TGTACA),bspCI(CGATCG),bspDI(ATCGAT),bsrBI(GAGCGG),
bsrDI(GCAATGNN),bsrGI(TGTACA),bssHII(GCGCGC),bst1107I(GTATAC),bstBI(TTCGAA),bstEII(GGTNACC),bstZ17I(GTATAC),
bsu36I(CCTNAGG),celII(GCTNAGC),claI(ATCGAT),drdI(GACNNNNNNGTC),eam1105I(GACNNNNNGTC),eciI(GGCGGA),eco47III(AGCGCT),
eco72I(CACGTG),eco81I(CCTNAGG),eheI(GGCGCC),esp3I(CGTCTC),espI(GCTNAGC),fseI(GGCCGGCC),fspI(TGCGCA),hindIII(AAGCTT),
hpaI(GTTAAC),kasI(GGCGCC),kspI(CCGCGG),mamI(GATNNNNATC),mstII(CCTNAGG),naeI(GCCGGC),narI(GGCGCC),ncoI(CCATGG),
ndeI(CATATG),ngoMI(GCCGGC),nheI(GCTAGC),nruI(TCGCGA),nsiI(ATGCAT),pacI(TTAATTAA),pciI(ACATGT),pflMI(CCANNNNNTGG),
pmeI(GTTTAAAC),pmlI(CACGTG),ppu10I(ATGCAT),psiI(TTATAA),psp1406I(AACGTT),pvuI(CGATCG),sacII(CCGCGG),sanDI(GGGWCCC),
sauI(CCTNAGG),scaI(AGTACT),sceI(TAGGGATAACAGGGTAAT),sexAI(ACCWGGT),sfuI(TTCGAA),sgfI(GCGATCGC),sgrAI(CRCCGGYG),
snoI(GTGCAC),snoI(GTGCAC),srfI(GCCCGGGC),sstII(CCGCGG),stuI(AGGCCT),styI(CCWWGG),swaI(ATTTAAAT),
xcmI(CCANNNNNNNNNTGG)